of this initiative, the Goverment has estalished a National Centre for Research in Glaciology at Dehradun to institutionalize glaciology research in India, and is endeavoring to strengthen the observational and monitoring networks as well as, network the knowledge institutions and strengthen their research capacity for co-ordinated research.

**Thin Film Composite**

3587. SHRIMATI JAYA BACHCHAN : Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is a fact that a CSIR laboratoy has developed a Thin Film Composite (TFC) reverse osmosis (RO) high flux memorandum for recovering process water for industrial use from domestic sewage through tertiary treatment;

(b) whether the technique has been used on a mass scale for treatment of water;

(c) if so, the details thereof; and

(d) if not, the reasons therefor?

THE MINISTER OF STATE OF THE MINISTRY OF SCIENCE AND TECHNOLOGY (SHRI PRITHVIRAJ CHAVAN) : (a) Yes, Sir. Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, Gujarat, (a constitutent lab. of CSIR) has developed and scaled up Thin Film Composite (TFC) Reserve Osmosis (RO) membrane technology. The technology is used primarily for drinking water application through desalination of brackish and seawater.

(b) Yes, Sir. Ten technique has been used on a mass scale for treatment of water.

(c) A list of various water treatment units that have been set up by CSMCRI is provided in the enclosed Statement (*See* below). Since 2000, CSMCRI has installed 53 RO desalination plants of various capacities which also includes. 1 plant in Kenya and 6 plants in Afghanistan. It has also designed and developed 2 mobile RO units which have been used to provide relief in natural Calamity affected areas.

(d) Does not arise.

***Statement***

*List of RO desalination plants installed by CSMCRI since 2000*

| Sl. No. | Location of Plant | State | Capacity LPH* | Year of installation | App. Feed water salinity (ppm)** |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1. | Mocha | Gujarat | 1500 | 2000 | 8,000 |
| 2. | Kisari | Rajasthan | 2000 | 2002 | 5,000 |
| 3. | Barmer Airforce station | Rajasthan | 1500 | 2003 | 3,000 |

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 4. | Nelamadur, Ramanathapuram, Dist | Tamil Nadu | 300 | 2004 | Seawater |
| 5. | Ervadi, Ramanathapuram, Dist. | Tamil Nadu | 900 | 2004 | 8,000 |
| 6. | Akkarapattai, Nagapattinam Dist. | Tamil Nadu | 2000 | 2005 | 6,005 |
| 7. | Hasnabad | West Bengal | 700 | 2005 | 3200 |
| 8. | Jaisalmer | Rajasthan | 700 | 2005 | 3000 |
| 9. | Nagaur | Rajasthan | 2400 | 2005 | 7000 |
| 10. | Barmer | Rajasthan | 2500 | 2005 | 3,000 |
| 11. | Andaman and Nicobar Island | Union Territory | 1000 | 2005 | 3,500 |
| 12. | Campbel Bay Island | -do- | 1000 | 2005 | 12,000 |
| 13. | Nelamadur, Ramanathapuram, Dist. | Tamil nadu | 1000 | 2005 | Sea water |
| 14. | Muilimunai, Ramanathapuram Dist. | Tamil Nadu | 1000 | 2006 | Sea water |
| 15. | Thirupalikudi Ramanathapuram, Dist. | Tamil Nadu | 1000 | 2006 | Sea water |
| 16. | Karankudu Ramanathapuram, Dist. | Tamil Nadu | 1000 | 2006 | Seawater |
| 17. | Tilonia | Rajasthan | 700 | 2006 | 2500 |
| 18. | Dwarka | New Delhi | 2500 | 2006 | 2500 |
| 19. | Surat | Gujarat | 2500 | 2006 | 4500 |
| 20. | Abadkuliyadanga | West Bengal | 2500 | 2006 | 15000 |
| 21. | Barge Mounted | West Bengal | 150 | 2006 | 15000 |

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 22. | Barmer | Rajasthan | 2500 | 2006 | 3000 |
| 23. | CSIR, Maharani Bagh | New Delhi | 5000 | 2006 | 2800 |
| 24. | Bhavnagar | Gujarat | 2000 | 2006 | 2600 |
| 25. | Bhuj Airforce station | Gujarat | 2000 | 2007 | 2500 |
| 26. | Bhuj Airforce station | Gujarat | 600 | 2007 | 2000 |
| 27.-28 | CMFRI, Mandapam | Tamil Nadu | 2000 | 2007 | 7000 |
| 29. | Kensalt | Kenya | 2000 | 2007 | Sea water |
| 30. | MARS, Mandapam | Tamil Nadu | 500 | 7000 | |
| 31.-36 | Six Villages | Afghanistan | 600-1000 | 2008 | 2000-3000 |
| 37. | CGCRI, Kolkata | West Bengal | 500 | 2008 | 2000 |
| 38. | Mahua | Gujarat | 600 | 2008 | 2200 |
| 39. | Vadodara | Gujarat | 500 | 2008 | 2800 |
| 40. | Kosuru | AP | 4000 | 2008 | 2000 |
| 41. | Air-Force, Naliya | Gujarat | 2000 | 2008 | 2000 |
| 42. | Air-Force, Naliya | Gujarat | 500 | 2008 | 2000 |
| 43. | Air-Force, Samana | Gujarat | 500 | 2008 | 2000 |
| 44. | Air-Force, Samana | Gujarat | 500 | 2008 | 2000 |
| 45. | Nagaur Dist. | Rajasthan | 2000 | 2008 | 5000 |
| 46. | Churu Dist. | Rajasthan | 2000 | 2008 | 5000 |
| 47-51. | Five Villages | Afghanistan | 600-1000 | 2009 | 2000-3000 |
| 52. | Chachiyawas | Rajasthan | 1000 | 2009 | 2900 |
| 53. | Siripuram | AP | 4000 | 2009 | 2000 |

*Litres per hour **Parts per million